

Spring 4-15-2014

The Nucleus 2013-2014

Rosalie A. Richards

Georgia College and State University, rosalie.richards@stetson.edu

Follow this and additional works at: <http://kb.gcsu.edu/sec>

 Part of the [Education Commons](#), [Engineering Commons](#), [Life Sciences Commons](#), and the [Physical Sciences and Mathematics Commons](#)

Recommended Citation

The Nucleus 2013-2014. Georgia College and State University. Issue 5. Richards, R.A. (editor).

This Article is brought to you for free and open access by Knowledge Box. It has been accepted for inclusion in Science Education Center by an authorized administrator of Knowledge Box.

THE NUCLEUS

Advancing the interest, engagement and understanding of science at Georgia College and beyond by people of all backgrounds. • Available online at gsu.edu/science • 2013-2014



EDITOR'S NOTE



Making Partnerships Count in STEM

The term STEM (science, technology, engineering and mathematics) has received much attention recently. As a collective, STEM is a partnership of disciplines that has also fostered a meta-discipline. Like any partnership, the sum of the parts of STEM is greater than the whole, spawning creativity and innovation. At the same time, we all know that partnerships can be sometimes difficult and require nurturing and reciprocity to achieve desired outcomes.

By definition, liberal arts colleges should be partnership-focused, offering opportunities for students to see their disciplines within multiple contexts. At Georgia College, not only do we have multiple partnerships in STEM but they work. Below, we share the top 10 principles that make our partnerships count in STEM for all stakeholders.

1. Maintain focus on the identified need
2. Keep capacity-building as a goal
3. Preserve a strong emphasis on the data
4. Plan often using authentic evidence
5. Integrate the voice of who we are serving
6. Place high value on good work and recognize it
7. Institutionalize good work to ensure sustainability
8. Seek resources to support the goal
9. Empower others thereby leveraging broader participation and leadership
10. Embrace change and communicate it with a plan

In this issue, we salute a few of the many distinctive interdisciplinary and cross-disciplinary collaborations that have produced innovative STEM courses, projects, and programs. As Georgia College implements its accreditation plan, Building A Culture of Engaged Learning, we highlight here a diverse set of university-community, K-20, and industry-academia STEM partnerships. We welcome more collaborations as we endeavor to build the STEM capacities in our region and state.

Happy reading!

Dr. Rosalie Richards, Editor



PG. 4



PG. 6



PG. 9



PG. 10

Science in Our Schools	3
Faculty Focus	4
Cover Story: Partnerships	6
STEM at GC	8

Signature Programs	9
Museum Moments.....	10
Going Green	11
Hot Topics/Calendar	12

Steve Dorman, President • Kelli Brown, Provost and Vice President for Academic Affairs • Ken Procter, Dean, College of Arts and Sciences
Olufunke Fontenot, Interim Dean, John H. Lounsbury College of Education • John Hachtel, Associate Vice President for Strategic Communications, University Communications

SCIENCE EDUCATION CENTER:

Rosalie Richards, Director • Candace Morrow, Information Manager • Amy Landau and Brittany Sapp, Graduate Assistants;
Patti Veal, Administrative Assistant • Heather Holladay and Emily Schmidt, Student Assistants; Sylvia Elakatt, Student Intern

EDITORS: Aubrie L. Sofala • Rosalie Richards | NEWSLETTER DESIGN: Brooks Hinton



"The Nucleus" is a Science To Serve newsletter published annually by the Science Education Center and University Communications at Georgia College. Science to Serve is supported, in part, by generous donations from the kaolin industry. The newsletter is available online at gcsu.edu/science
349 Herty Hall • 478-445-7531 • Send us your science news: science@gcsu.edu



MAKING PARTNERSHIPS WORK IN STEM AT GEORGIA COLLEGE EARLY COLLEGE



Dr. Runee Sallad is no stranger to change and challenge. In 2011, she took the helm as manager and director of curriculum and instruction at Georgia College Early College, a grades seven through 12 laboratory school at Georgia College. Dr. Sallad immediately reached out to the broader community to create STE³M partnerships – Science, Technology Engineering, Environment, Economy and Mathematics focused on sustainable Energy for a Sustainable Local Economy. Here are some STE³M components already in place at Early College:

- CHEM 1211 – high school students take a hybrid first-year college chemistry course at Georgia College with chemistry instructor Shep Little and high school teacher, Lauren Parton
- Teacher Professional Development – teachers are members of the Science and Mathematics Alliance for Regional Teachers (SMART) partnership; several teachers collaborate with college faculty on STEM Mini-Grant projects; and teachers from all disciplines participate in science and engineering fair workshops
- Science & Engineering Fair – students and parents participate in evening workshops to prepare for Fair
- Capstone Projects – a grant proposal was submitted to acquire resources to help prepare middle and high school students develop capstone projects on sustainable energy that spans all disciplines
- STE³M Academy – a new summer camp will launch a year-long focus on how to conduct research, write and present work that integrates STEM throughout the curriculum
- Forensics Academy – students will participate in the inaugural academy at the new STEM laboratory at Central State Hospital campus



FUN IN NUMBERS: STUDENTS ADD FUN FACTOR TO LEARNING MATH

Georgia College math education students participated in Math Night at Ridge Road Elementary School in Sandersville, Ga. during the spring 2013 semester. The night focused on showing the fun and value of math to third- through fifth-grade students. More than 350 participants attended the annual event.

Georgia College students and local teachers developed various interactive stations to engage participants during Math Night.

"Math Night is a great experience for Georgia College students and faculty because it directly connects them with what's happening in K-12 education," said Dr. Robert Blumenthal, mathematics department chair.

Mathematics is a STEM — science, technology, engineering and mathematics — subject area. Launched during 2007, the STEM Initiative aims at increasing success in these majors and produce more and better science and mathematics teachers.



TEACHERS PRESENT AT GSTA

Oak Hill Middle School teachers presented "Interactive Notebooks for Success in the Middle" at the Georgia Science Teachers Association Conference 2014.



STUDENT WINS AT INTERNATIONAL COMPETITION

Howard High School Senior Teva Ilan placed fourth at the Intel International Science and Engineering Fair in Phoenix, Ariz. in May 2013. The then junior also received an award of \$500 for his Animal Sciences project, "Response of Soil Invertebrates to Electromagnetic Stimuli." Teva earned the chance to compete at the international fair after being named the high school winner of the "Best of Show" category at the Regional Science and Engineering Fair in February 2013 at Georgia College.

SCIENCE AND MATHEMATICS ARE NOT SPECTATOR SPORTS

Teams of science and mathematics teachers raced across the basketball court at the Wellness Center to complete the final challenge of a five-activity Math-Science Decathlon. Task: use multiple geometric shapes to create this shape. Stop the clock. Hands up!

During July 2013 and throughout the 2013-14 school year, teachers from the six school districts of the Oconee Regional Educational Service Agency participated in the SMART Partnership project. The two-year cohort of teachers began learning about the science and mathematics behind sporting activities alongside university instructors.

For more on SMART, contact Robbie.Ray@oconeeresea.org.

FACULTY FOCUS



ADVENTURE TO PERU: STUDENTS TAKE MATH OUTSIDE THE CLASSROOM

In June 2013, nine mathematics majors, accompanied by Associate Professor of Mathematics Dr. Ryan Brown, took off on an adventure to the South American country of Peru. The purpose of the study abroad trip aimed at understanding the mathematics behind Inca and other pre-Columbian cultures. The trip included examining artifacts firsthand and traveling to archeological sites to conduct investigations.

Among the students was Juliana Martins, who conducted research for her senior capstone while in Peru. Martin's research focused on the quipu, a record-keeping device the Incans used that consisted of a group of knotted cords that encoded information.

"My research focuses on determining whether these tools were used to monitor the solar and lunar cycles of the 16th century and how that would have been accomplished" Martins said.

Their adventure in Peru led them to see ancient textiles and ceramics, witness ruins at archeological sites and even an unex-

pected bus ride through the Andes—the highlight of the trip came at viewing the winter solstice sunrise at Machu Picchu.

FACULTY MEMBERS HAVE TIES TO NOBEL PRIZE WINNERS

Two Georgia College faculty members were trained alongside the recent winners of the Nobel Prize in Medicine.

James Rothman, Randy Schekman and Thomas Sudhof jointly won the 2013 Nobel Prize For Physiology or Medicine earlier. The trio earned the prize for their discoveries of machinery regulating vesicle traffic.

Dr. Mike Gleason, a professor in biological sciences, worked in the laboratory of Dr. James Rothman who was one of the winners.

"Rothman was great at seeing all of the different controls and experiments that would be needed to make the case for a hypothesis or to disprove another," said Gleason. "This invaluable training is something I've tried to pass onto my own students."

Dr. Ellen France, an associate professor in biological science, obtained her doctorate degree with Dr. Peter Novick at Yale. Novick worked with Dr. Randy Schekman, another of the recipients, on several studies.

"My Ph.D. advisor at Yale University was Novick. He was one of the first graduate students of Schekman at UC Berkeley," said France. "My thesis was based on their initial research. For the reason of this connection, I have met Schekman several times."

Gleason and France plan to continue their own lines of research in vesicle trafficking with the assistance of biology undergraduate and graduate students.



"I want to use my experiences to encourage and inspire young African-American students"

- Chavonda Mills

PROFESSOR AIMS TO INSPIRE THROUGH HIV RESEARCH

A Georgia College professor was part of a team that recently received a patent for their research.

Dr. Chavonda Mills was working towards her Ph.D in medicinal chemistry at Florida A&M University in Tallahassee when she and two other researchers created therapeutic agents that could treat HIV and some forms of cancer.

The team began their research in 2001 titled "Synthetic Flavonoids and Pharmaceutical Compositions and Therapeutic

Methods of Treatment of HIV Infection and Other Pathologies."

Now more than seven years later, the chemistry professor learned their findings could make a difference for people diagnosed with the illnesses.

"This is just the first step in a very long process," said Mills. "Although the compounds show great promise, numerous tests to evaluate their toxicity are still required. Whether or not we will reach the level of clinical trials is unknown at this point. However, our discovery serves as a significant contribution to the ongoing research efforts to find treatments for HIV and cancer."

Mills also hopes that this discovery will spark student's interest in science, technology, engineering or mathematics (STEM) fields.

"I want to use my experiences to encourage and inspire young African-American students," Mills said. "There is a disproportionately small number of women and minorities in STEM fields so mentors and role models are scarce. By serving as a mentor, I hope to inspire young men and women of color to pursue careers in STEM fields."



UNDER THE DOME: FACULTY INSPIRES OTHERS TO STUDY ASTRONOMY

It's a cold Friday night in January and just as the downtown stores begin to close and the bars dim their lights in anticipation of the nightly crowds, there's a crowd gathering in Herty Hall. However, you'll only find this crowd if you bother to look up.

Dr. Donovan Domingue, professor of physics and astronomy, hosts monthly observatory nights open to the public. At this monthly event, community members have a chance to look through the telescope on the 4th floor of Herty Hall, in hopes of gazing at everything from supernovas to catching a glimpse of Jupiter.

"As a researcher, I am privileged to be part of the investigation process and our results would have been much less meaning without the public appreciating and supporting the process," said Domingue.

Domingue also ensures students have a chance to understand and appreciate the subject of astronomy—opening the learning process up to all students, not only science majors.

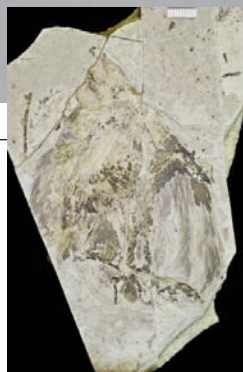
"I teach both introductory courses and upper level," said Domingue. "The ASTR 1000 courses are for students of many majors across campus and they are my chance to enhance or introduce the great ideas of our scientific history which have inspired so many people to look up at the sky in wonder."

Domingue has had his own fascination with the sky through his research on infrared light emitted from galaxies that have found themselves in newly formed pairs—these galaxies are also known to merge with others to form a larger galaxy.

"As an astronomer, it has always been of importance to me to investigate, understand and share the origins of the universe and therefore tell the beginnings of the story of humanity," said Domingue.

The astronomer collaborates mainly with Kevin Xu of the NASA Herschel Science Center at the California Institute of Technology, where Domingue spent a summer as a NASA faculty research fellow. Domingue says it was his time at the science center that further inspired him to provide outreach to not only students but the community as well.

"Outreach is the birthplace of the next generation," said Domingue. "The next generation of scientists which will continue our effort to understand the universe."



PROFESSOR HELPS IDENTIFY RARE FOSSILIZED BIRD

Dr. Bob Chandler, biology professor at Georgia College, has worked for more than 30 years researching modern and fossil bird species.

Recently his expertise was used to help identify a new fossil found by a 10-year-old girl in Colorado. The fossil was found in pieces of shale and rock brought to the class by Park Rangers from Florissant Fossil Beds National Monument.

"I received a call from Herb Meyer with the National Parks Service, who is a longtime colleague of mine. He wanted me to help identify a new bird found," Chandler said.

Chandler was sent a photo of the fossil and noticed several identifying features.

"From the shape of the head and the feet with short toes I determined that it was a potoo from the same family as whip-poor-wills and nighthawks," said Chandler. "Since the fossil dated back about 34 to 35 million years, it is a very significant find."

This fossil is the first potoo found in North American from the Eocene time period.

For more information on Florissant Fossil Beds National Monument, visit nps.gov/flfo.

To learn more about the biological and environmental sciences department at Georgia College, visit gcsu.edu/biology.



PARTNERSHIPS MADE THROUGH RESEARCH STUDY ABROAD PROGRAM

In June 2013, Drs. Samuel and Christine Mutiti, of the Department of Biology and Environmental Sciences, led a research study abroad program to Zambia. Georgia College students participated in the program focused on how a non-profit community water project supplies clean water to an unplanned settlement as well as the environmental impacts of mining and water resources. The program was a partnership between Georgia College, Miami University Ohio and the University of Zambia. Two graduate students from the University of Zambia are continuing the projects initiated during this trip.

THE POWER OF PARTNERSHIPS IN STEM

Whether its a tutor taking time to explain a particular theory, a professor collaborating with NASA to further their research or even a new relationship with a local business—partnerships are an abounding theme in science, technology, engineering and mathematics (STEM) across Georgia College.

STEM at Georgia College relies on partnerships to not only function, but also to produce well-prepared students ready to enter any career.

Course conscious



When it comes to looking at what makes partnerships tick, Dr. Joe Richardson, division manager of electronic warfare at Mercer Engineering Research Center, knows the solutions and issues surrounding successful partnerships in higher education.

Richardson received his doctorate in educational leadership for higher education from Mercer University and wrote a dissertation on characteristics between STEM industries and colleges. One of the main focuses of Richardson's research was job preparedness of STEM graduates.

"What I see on a daily basis is how difficult it is for us to get engineers into the organization," said Richardson. "We always have job openings and often times we're looking at applicants who have not been adequately prepared from colleges to qualify for those entry level positions."

According to the McKinsey Center for Government in a study on education and employment, 72 percent of educational providers thought graduates were ready to enter the job market. That number contrasts with the 45 percent of graduates who believed they themselves were ready to enter the job market.

To combat disconnects such as these, STEM professors are teaming up to design courses focused on activity-based learning. Climate and Chemistry, for example, is in its third year of implementation. The course is a collaboration between Associate Professors of Chemistry Drs. Julia Metzker, Chavonda Mills and Catrena Lisse.

"We were already very interested in effective teaching and learning," said Metzker. "One of our goals for the course is to get students to think critically, but also for them to think about what it means to be a scientist."

The class, a fusion of two disciplines, focuses heavily on projects, experiential learning and problem solving.

"The real focus on these types of courses is demonstrating your understanding as opposed to getting the correct answer," said Metzker. "Once you get into a career or graduate school that's all you're going to be doing is demonstrating evidence—there is no right answer."

A break from the traditional lecture-based course, this class and others like it such as Water and Society, are sometimes met with hesitation from students.

"I had no clue what I was getting myself into so it was a big adjustment," said sophomore chemistry major Anna Hearon. "But the way in which you apply the principles you're learning makes you understand the material better. You can't fake it, you have to be able to reproduce it which offers a deeper level of learning." Hearon became a supplemental instructor for the course the semester after taking it. She applies some of the same techniques used in the course, such as stressing the importance of not looking for the right answer and discussion-led learning.





Faculty bridge the gap

For many STEM educators, simply molding the minds of future scientists, mathematicians or technology professionals isn't where their work ends. Internal and external collaborations with laboratories, industry and government sectors are all part of what makes successful, innovative educators.

"Informed competent leadership has to be part of your partnerships," said Richardson. "Faculty members at colleges have decades of experience working in a particular field—so they are very informed."

These types of partnerships between faculty and external collaborating resources expands opportunities for students to get real life experience in their chosen field.

Dr. Kalina Manoylov, associate professor of biology, is one of the many faculty that balances teaching with an ever-growing list of partnerships, which range from local collaborations with Georgia Power and Andalusia—to larger projects such as her work with the Academy of Natural Sciences in Philadelphia, Pa.

"I know algae," said Manoylov. "When people think of algae, they somehow think of me. Having collaborations is part of my job as an aquatic ecologist. It's a very applied field so it's ideal for partnering with other labs and companies. Basically they want to work with me because at the end of the day I'm going to tell them whether this water is clean or not based on the algae I observed in the samples."

Manoylov has inspired the same level of exploration in her students. A study published in 2012 by an undergraduate student looked at the presence of algae in Kaolin mines, which was the first of its kind to be conducted.

"I do a lot with outside sources, but I find it very rewarding teaching students and bringing them to a level where they can do amazing research like this," said Manoylov. "They learn so much themselves and gain confidence by doing this. Then, they can go and conquer the world, as I tell them."

Manoylov's capstone class is focusing on algal blooms in lakes for spring semester. Students will contribute to a paper on prevention, response, causes and effects of algal blooms, which will be presented to Georgia Power. Manoylov hopes projects such as these inspire the students to make their own connections and spark new, creative

research topics.

"As an aquatic ecologist, I know great deal about my field, but when my students come to me with new ideas, I'm always excited," said Manoylov. "They are the future. I can give them the foundation, but then it's up to them to go and create something new."



STEM connects with community

Community involvement, which is a cornerstone of Georgia College's mission, is also highly effective in STEM fields. Ensuring students and faculty benefit from collaboration is vital, but also engaging with local communities further drives innovation in STEM departments.

"I believe that most universities see themselves as responsible to the communities they are lodged," said Linda Watson Kaufman, former director of Afterschool Achievement at Georgia College. "But what I think is honorable and terrific is the way Georgia College has reached out to the community and offered the depth that our programs have."

The Youth Enrichment Services Program (YES) created by Kaufman in 2007, focuses on increasing graduation rates, raising achievement and education aspirations for students and adults in Baldwin County. The YES Program is made possible through funding from the Department of Education. According to Kauffman, it is the Georgia College student workers and volunteers that make STEM tutoring one-of-a-kind.

"College students are able to bring learning to a level that students understand," said Kaufman. "I watched students struggle with fractions many times because it's an abstract concept and they can't visualize it. So what some tutors will do is grab paperclips and illustrate the concept that way. Making it fun is how our tutors have excelled when it comes to STEM."

Senior Biology major Anshika Rimal is a student tutor with the program and is placed at Blandy Hills Elementary School. Rimal tutors third through fifth grade students on a range of topics.

"We watch videos about whatever concept we're learning, then we'll discuss it," said Rimal. "Then we usually perform an experiment, and while we're doing different steps, we ask students what's going on and what theory and concept it relates to."

Passionate and engaged student volunteers are the key to the YES Program, according to Kaufman.

"What's different about our volunteers is that they really put their heart and souls into this," said Kaufman. "They see a great need in this community for education and they provide it, no questions asked."

Service-focused goals are also the norm when it comes to STEM-related student organizations. The Georgia College Gardening Club, coming into their second year this spring, marks community engagement as part of their core mission.

"Our hope is that we instill practices of gardening on campus, but also in the community," said Hannah Foster, president of the Gardening Club. "We also want to raise awareness of different types of food and ways to use them. It's really about educating ourselves, but also the campus and community."

The club began hosting workdays with the Lucille Harris Community Garden in Baldwin County this semester. The blooming partnership with the garden is proving to be a learning experience for club members and a valued resource for the community garden.

"We and the local residents who are involved have been delighted by the interest and support we have received from the wider community," said Debbie Harshbarger, project leader at the Lucille Harris Community Garden.

Gardening Club Advisor and Assistant Professor of Plant Biology Taylor Quedensley also sees the necessity of community outreach.

"One of the focuses for the club is to make these lasting relationships in the community," said Quedensley. "There's so much we can do in the community and I think taking advantage of those opportunities is crucial to the goals of the club."

At the center of every partnership in STEM are the meaningful relationships that are produced. For students, faculty and professionals in STEM fields, these relationships translate into future research, jobs, lasting connections and ultimately guides students on their paths to success.

"You have to take your education and then apply it," said Richardson. "You don't go into a STEM field just for the sake of receiving an education. You have a duty to apply what you've learned to improve your livelihood as well as the world around you."



GEORGIA COLLEGE HOSTS FIRST STEM SUMMIT

The inaugural STEM Summit brought together representatives from businesses, local government, universities and colleges and K-12 schools.

The goal is to create a training laboratory to advance science, technology, engineering and mathematics (STEM) research and develop the workforce.

About 50 people from across the country came to Milledgeville to explore options to make that possible.

"We chose Milledgeville as the site for the laboratory because of the opportunities with buildings on Central State Hospital's campus and the educational environment of the area," said Darrell Davis, chairman of the Committee for Action Program Services (CAPS), which is based near Dallas, Texas.

Davis started the company CAPS-Analytical Training Laboratory LLC. and organized the Summit to create partnerships and collaboration for the new facility. He expects it to open during spring 2014 in the Wilkes Building at Central State.

Georgia College hosted the event, which brought together representatives from Baldwin County Schools, Georgia College Early College, the Central State Hospital Redevelopment Authority and Agilent Technologies.

Representatives from several colleges and universities across the southeast also attended.

"The plan will be for this laboratory to become a nucleus for shared scientific instrumentation, training, research and outreach," said Dr. Rosalie Richards, Kaolin Endowed Chair in Science and director of the Science Education Center at Georgia College.

Georgia College is making great strides to advance STEM education by increasing the quantity and quality of STEM majors and teachers. The university has been a recipient of the University System of Georgia's STEM Initiative since 2007.

Davis commended Georgia College's current STEM outreach and said he looks forward to collaborating in the near future.

For more information on the STEM Program at Georgia College, visit gcsu.edu/stem.

STUDENTS EXCEL THROUGH PEER INSTRUCTION

Supplemental Instruction (SI) has been a staple of Georgia College academic support for the past three years. At the helm of the program is Learning Center Coordinator Jeanne Haslam, who oversees not only SI but all other Learning Center positions, positions and the Math Lab. Haslam has taken command of the program and seen it grow in the past year.

"There are always certain subjects that are in constant demand," said Haslam. "Areas like physics, biology, chemistry and statistics are always popular. Our students want to do well and the Supplemental Instruction program is aimed at doing that."

Haslam goes through a rigorous process of not

only finding the instructors for SI, but also in maintaining an effective learning environment for students who attend the sessions.

"I like to give them certain tests and certain scenarios that might occur in a session," said Haslam about hiring student instructors. "A peer instructor has to know the content of course...but what's more important is their ability to communicate the content."

In Spring 2014 semester over 70 requests were made from professors for SI Leaders and the Learning Center funded 48. SI is a collaboration between the Center for Student Success and the STEM Initiative at Georgia College.

STEM SYMPOSIUM CELEBRATES FIVES YEARS OF GRANT RESEARCH

The Georgia College Math + Science = Success mini-grants program celebrated five years of research funding at the annual STEM (Science, technology, engineering and math) Symposium.

Georgia College faculty members, staff and K-12 educators came together to hear updates from grant-funded research with the goal of bettering education in STEM fields.

Biology chair Dr. Indiren Pillay presented his research on engaging undergrads and non-science majors in biology.

"At many institutions, freshmen and sophomores are rarely given the opportunity to experience discovery science," said Pillay during his presentation. "My goal would be to create a new course that would make that possible."

Faculty also presented a variety of research projects including assessing a tutoring initiative for computer science students, a STEM learning community at Northeast High School in Macon and learning to teach general chemistry in new ways.

"This program is part of the state-wide STEM initiative," said Dr. Jason Huffman, past STEM coordinator for Georgia College. "Since 2008, the mini-grants program has funded 66 projects totaling more than \$380,000."

The 2013 symposium was also a celebration of Georgia College's STEM achievements. Georgia College President Dr. Steve Dorman accepted the STEM Education award presented by the Technology Association of Georgia (TAG) and TAG Education Collaborative.

"The work being done in STEM fits in well with our liberal arts mission; the focus on student engagement often takes learning beyond the traditional classroom," said Dorman.

SYMPOSIUM ADVANCES UNDERGRAD RESEARCH

Georgia College hosted the second annual Undergraduate Research and Creative Endeavors (URACE) Symposium in March 2013 to strengthen student-faculty undergraduate research on campus. The workshop explored best practices for expanding and sustaining creative work and undergraduate research opportunities.

"This annual event is an opportunity for the center to support faculty in identifying ways they can encourage and engage students in undergraduate research," said Dr. Steven Jones, director of the Center for Engaged Learning, Teaching and Scholarship. "This year's symposium featured a panel of students, who discussed the importance of building faculty relationships for both collaborative and independent research."

Nearly 30 faculty members and 15 students participated in the event organized by Undergraduate Research Initiative members: Drs. Ryan Brown, Hauke Busch, Steven Jones, Robin Lewis, Kalina Manoylov and Rosalie Richards.

The university-wide symposium was established in 2012 to help faculty create road maps for promoting and supporting student-faculty research on the disciplinary and departmental level.

During the spring 2013 symposium, the center's Office of Undergraduate Research and Creative Endeavors awarded recipients with URACE grant funds to support undergraduate summer and departmental research projects. For a full list of recipients visit gcsu.edu/engagement/studentresearch.

STEM MINI-GRANT AWARDS 2013-14

■ Kirk Armstrong, Bringing Anatomy & Physiology to Life: Building models to enhance understanding of muscular, cardiovascular and endocrine systems (Health & Human Performance)

■ Victoria Deneroff, Researching, learning and enacting Science Talk in middle grades classrooms (Foundations & Secondary Education)

■ Mike Gleason, Ellen France and Kasey Karen, Inquiry activities for a learner-centered Genetics course (Biological & Environmental Sciences)

■ Rui Kang, Catrena Lisse, STEM Professional Learning Community for building a model of culturally responsive STEM education in rural middle Georgia (Foundations & Secondary Education)

■ Kelly Massey, Clay modeling of the musculoskeletal system: Does active learning increase retention and comprehension? (Health & Human Performance)

■ Brian Mumma, Teaching the science within local dirty jobs (Foundations & Secondary Education)

■ Christine Mutiti, Compiling an inquiry-based activity course packet for the Life and Earth Science course for Pre-Early Childhood Education majors- part 2 (Biological & Environmental Sciences)

■ Gita Phelps, The Tutoring Program in Computer Science (Computer Science)

■ Sandra Webb, Building capacity in a whole-school STEM Learning Community at NEHS: Improving student achievement, teacher education and STEM professional learning (Early Childhood & Middle Grades Education)

■ Caralyn Zehnder, Samuel Mutiti, Developing a new GC2Y course: Water & Society (Biological & Environmental Sciences)

SIGNATURE PROGRAMS

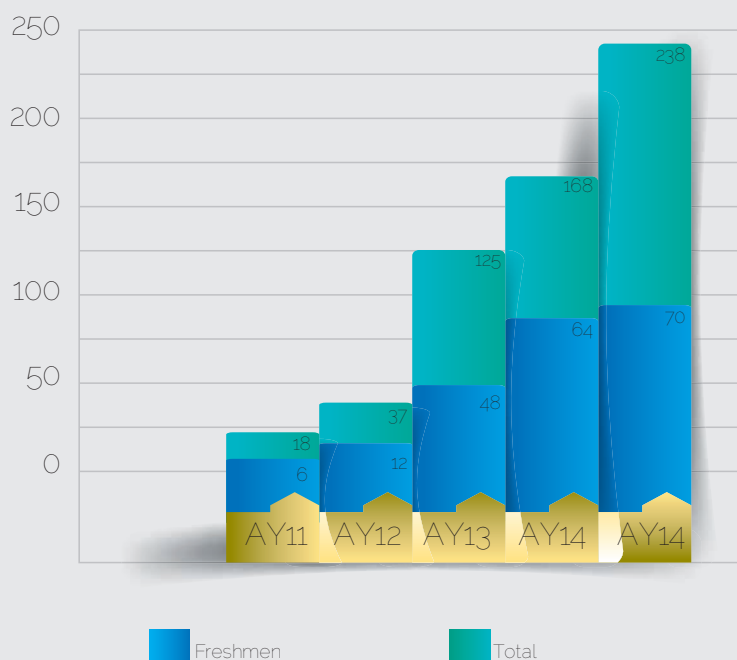
PARTNERING IN PHYSICS: DUAL DEGREE PROGRAM BENEFITS STUDENTS



Fall 2013 marked the beginning of a dual degree engineering program between the Georgia College physics program and the Georgia Institute of Technology. Students enrolled in the program will now receive a Bachelor of Science degree in physics from Georgia College as well as an engineering degree from Georgia Tech after the five-year period.

The program requires students to spend three years at Georgia College and two years with Georgia Tech. The physics program has seen record numbers for the program in 2013. Spring 2014 marked the first round of students being sent to Georgia Tech. More than 60 freshman are enrolled in the program contributing record-breaking enrollment for the physics program.

GC PHYSICS MAJORS BY ACADEMIC YEAR



FROM AFRICA TO MILLEDGEVILLE: NEWELL SCHOLAR BRINGS WORLDWIDE CULTURE TO GEORGIA COLLEGE

Some people are content to live their lives with a sense of normalcy, a 9-to-5 job and a place to call home. Others choose to live outside the box with adventure and a dynamic that can't be confined within walls. The Georgia College community recently welcomed a distinguished guest scholar who brought her adventures from Africa to Milledgeville.

The inaugural Martha Daniel Newell Visiting Distinguished Scholar, Dr. Caitlin O'Connell-Rodwell, has spent 20 years studying elephants in the African country of Namibia. A full-time faculty member at Stanford University, she spent spring semester 2013 as a guest at Georgia College.

"My work is understanding how elephant society works, including detailed measurement of how they communicate," she said. "I did a 10-year study on how they vocalize and how those low frequency vocalizations are spread through the ground."

She found that elephants can technically hear through their feet. By sensing the vibrations in the ground, they can determine the meaning of calls and react to them.

During the semester, O'Connell-Rodwell taught a special seminar class to students majoring in the sciences and in Creative Writing. The class focused on creative non-fiction writing and also gave the students a look at prospective careers in the field.

"A lot of the students already had good writing skills, but I'm trying to encourage them to add a science theme to that writing," said O'Connell-Rodwell. "There are a lot of great outlets for their work. A lot of great editor positions for people who are great writers and a lot of great science writing opportunities."

O'Connell-Rodwell completed a book about how baby elephants grow up in the wild and sold a science memoir project to the University of Chicago Press. In both, she plans to acknowledge the Georgia College Newell Scholar Program, which allowed her to complete the projects.

The inaugural Newell Scholar imparted knowledge to students, faculty, staff and the community. But as she left for the next adventure, her parting words ring true that anyone can make their own destiny.

"The thing that I would like to leave with people is that you can really make your own future," she said. "It's hard. There are a lot of challenges to doing that, but anything is possible if you set your mind to it and work hard."

To read the full story on Dr. O'Connell-Rodwell's time at Georgia College in 2013 visit: connection.gcsu.edu/



SUSTAINING CHANGE 2014 IC-BG SUMMER INSTITUTE

Educators from across the state will explore how to move during the third annual Innovative Course-building Group (IC-bG) Summer Institute. The one-day event will take place Friday, May 16, at Georgia College's Macon Graduate Center. The institute will feature interactive sessions around design and assessment of courses, programs, and projects. Visit icbg.wordpress.com for more information.

NEW EXHIBITS IN THE GEORGIA COLLEGE NATURAL HISTORY MUSEUM WILL BRING LIGHT TO THE MYSTERIOUS WORLD OF DINOSAUR EXTINCTION AND FOSSILS.

THE GREAT AMERICAN BIOTIC INTERCHANGE

South America once was an island continent. Around 3 million years ago a land bridge formed between North and South America, allowing species to travel between the two continents. Dr. Bob Chandler, professor of Biology, has been studying this phenomenon, called the Great American Biotic Interchange, and has collected fossils of giant sloths, glyptodonts and 6-foot-tall killer birds from several sites in Florida. These fossils, in addition to many others, are displayed in this newly revised research cabinet.

GLOBAL COOLING

Another new exhibit is answering questions about the extinction of dinosaurs. Dr. Bill Wall, professor emeritus of Biology, has been studying dinosaur extinction for over 25 years. This newly-renovated exhibit displays fossils of both archaic and modern species and discusses how changes in the environment led to drastic changes in mammal species.

HOW ARE FOSSILS FORMED?

A revised exhibit exploring the processes of fossils is underway. This revised exhibit explains the different processes involved in fossil formation, with interesting examples of each.

DINOSAUR GARDEN

The museum is also in the process of developing a Dinosaur Garden, their first outdoor exhibit, which is visible from the front door of the museum. Visitors will get a glimpse of how things may have looked when dinosaurs roamed the earth.

All exhibits are free and open to the public. For more information about the museum, call 478-445-2395.



KEEPING CAMPUS GREEN: Q&A WITH LORI STRAWDER

Lori Strawder, assistant director of Facilities Operations for Sustainability, wears many hats. Strawder's position requires her to focus on energy management and waste reduction on campus, but she also works with groups on and off campus to create a culture of awareness for a more sustainable region.

Q: Tell us a little about your duties at Georgia College

A: As the assistant director of facilities operations for sustainability, I'm responsible for the advancement of sustainability, engaging with various individuals and group on and off campus. For a more sustainable campus, my job is fostering a campus culture of communication, awareness and behavior change.

Q: What are some ongoing projects?

A: Energy management projects are always ongoing. Lighting conversions, HVAC improvements, fixture and equipment replacements, etc. are also ongoing. The Recycling Plan was implemented in May 2013 as a campus-wide initiative for the diversion of waste, and a composting project is planned for the near future.

Q: How do you partner with the science department to improve sustainability initiatives on campus?

A: The science department, as are other groups, is an excellent resource for fostering and garnering ideas for sustainability proposals/projects ultimately for achieving a more sustainable campus. The knowledge and experience of the faculty and their willingness to share information has been great.

The activities/events that science department coordinates during the year, I try to participate as often as I can. Working with the faculty on projects, committee work or coordinating events, I enjoy as well and look forward to more.

GOING GREEN



STUDENT CLUB PARTNERS WITH COMMUNITY

As the Georgia College Environmental Club gears up for another semester of raising awareness of sustainable initiatives on campus, they also are continuing their collaborations with local community organizations.

"This past winter break there was some flooding that happened out at the Oconee River Greenway," said Justina Everhart, president of the Environmental Science Club, about one of the cleanups in 2013. "So what we'll do is go out there and clean up the debris and get things out of the trees."

The club hosts multiple river cleanups as well as promotes the local farmers market during the spring semester. Partnering with the community is an important role for the club, but Everhart

also says it's about ensuring members gain valuable experience.

One of the club projects that is currently in its early stages is working with faculty to adopt a stream in Milledgeville for water testing.

"Our goal is to get more students graduating with certificates," said Everhart. "It's definitely a long term goal of ours, but we're doing what we can to develop that now."

The Environmental Science Club also hosted Earthfest this year. This year the club continued with the tradition of having live entertainment as well as having tables that range from bracelet making, face painting and even a "bring-your-own" T-shirt screen-printing workshop.

"We've always had a lot of these activities at Earthfest," said Sara Loaiza, public relations and marketing chair for the club. "But we're continually thinking of new workshops or events to do. Earthfest is also a great way for us to collaborate with local community members and businesses."

Environmental Science Club meetings are Mondays at 8 p.m. in Arts & Sciences 270. For more information visit: <http://www2.gcsu.edu/orgs/student/esc/>

STUDENTS WIN BIG AT STATEWIDE CONFERENCE

Two Georgia College seniors brought home awards from the Georgia Academy of Science Annual Conference.

Loribeth Berry and Tyler Mattix won best oral presentations in the earth science category.

Mattix, whose research focused on tracing the prevalence and potential sources of estrogen, *E. Coli* and coliform in two waterways in Milledgeville, Ga., was surprised to get the news.

"I thought it was a joke at first when I found out I had won," said Mattix, senior environmental science major.

Berry's research was focused on classifying sedimentary rocks, and this is the second year she's won at the conference.

"I enjoy seeing what others have found through their research. Each project is so different that conferences are almost like a speed learning event," said Berry.

More than 200 students and faculty members participated at Valdosta State University. The two students in each category (earth and atmospheric science, biology, chemistry and physics) who were ranked highest by judges received an award and prize money.



Science Education Center

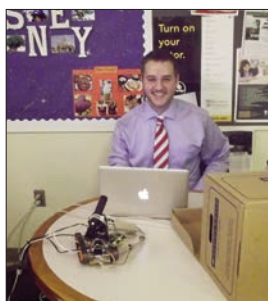
Georgia College, CBX 082
Milledgeville, GA 31061
Phone 478-445-7531
Fax 478-445-1092
science@gcsu.edu

HOT TOPICS

Check out more Georgia College science, technology, engineering and mathematics stories by visiting info.gcsu.edu and searching the headlines below:



Delta GEMS participate in monthly sessions



Computer science students create interactive computer systems



Students present their own Pop-Up Museums



Military veteran graduated from dual degree pre-engineering program



Science camp engages young minds

CALENDAR OF EVENTS 2014

Visit gcsu.edu/science for more events.

MAY

- 9 Georgia STEM Day
- 11-16 International Science & Engineering Fair (Los Angeles, CA)
- 16 IC-bG Summer Institute – Innovative Course-building Group (Georgia College Macon Campus)
- 27-31 NCORE – National Conference on Race & Ethnicity (Indianapolis, IN)
- 30 STEM Mini-Grant Awards announced (Georgia College)

JUNE

- 2-6 Math Camp (Georgia College)
- 2-22 STEM Academy (Georgia College)

JUNE (cont.)

- 2-22 Forensics Academy (Milledgeville, GA)
- 9-13 Science Camp Jr (entering grades 3-5; repeat camp) (Georgia College)
- 12-15 cCWCs Chemistry Faculty National Workshop (Charlotte, NC)
- 19-22 COPLAC Annual Conference (Durango, CO)
- 23-27 Science Camp Jr (entering grades 3-5; repeat camp) (Georgia College)
- 28-30 Council of Undergraduate Research Biennial Conference (Washington, DC)



JULY

- 1-11 SMART Summer Institute - Science and Mathematics Alliance for Regional Teachers (Georgia College)
- 7-11 Science Camp (entering grades 6-9) (Georgia College)
- 28-31 Science Education Center closed (Georgia College)
- TBD STEM Summit (TBD)

OCTOBER

- 15 National Fossil Day at the Natural History Museum (Georgia College)
- 19-25 The Sweet Side of Chemistry - National Chemistry Week (Georgia College and Regional)